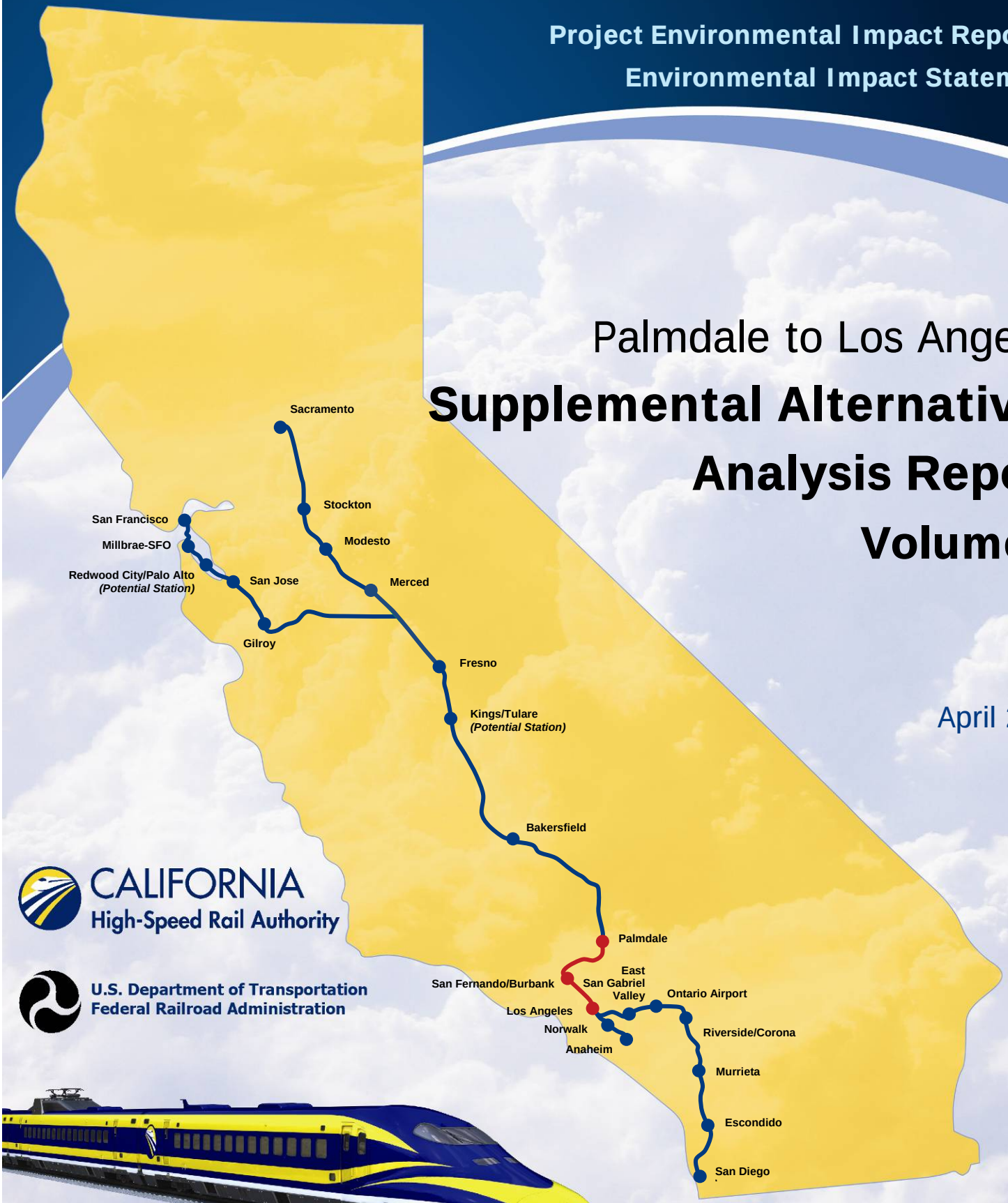
CALIFORNIA HIGH-SPEED TRAIN

Project Environmental Impact Report / Environmental Impact Statement

Palmdale to Los Angeles

Supplemental Alternatives Analysis Report Volume 1

April 2012



CALIFORNIA High-Speed Rail Authority

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California High-Speed Train Project

Palmdale – Los Angeles

SUPPLEMENTAL ALTERNATIVES ANALYSIS REPORT

April 2012

TABLE OF CONTENTS

TABLES

FIGURES

ABBREVIATIONS / ACRONYMS

AA .....Alternatives Analysis

Amtrak.....National Railroad Passenger Corporation

Authority.....California High-Speed Rail Authority

Caltrans .....California Department of Transportation

CDFG .....California Department of Fish and Game

CEQA.....California Environmental Quality Act

CGS.....California Geological Survey

CHSTP .....California High-Speed Train Project

CMF.....Central Maintenance Facility

CNG.....Compressed Natural Gas

CNPS .....California Native Plant Society

CRHR.....Californian Register of Historic Resources

CWA .....Clean Water Act

EIR.....Environmental Impact Report

EIS .....Environmental Impact Statement

EMT.....Engineering Management Team

FEMA.....Federal Emergency Management Agency

FRA .....Federal Railroad Administration

GIS.....Geographic Information System

HOV.....High Occupancy Vehicle

HST .....High-Speed Train

LADOT .....City of Los Angeles, Department of Transportation

LAP... .....Los Angeles to Palmdale

LA River .....Los Angeles River

LASHP.....Los Angeles State Historic Park

LAUS .....Los Angeles Union Station

LOSSAN .....Los Angeles to San Diego Passenger Rail Corridor

Metro.....Los Angeles County Metropolitan Transportation Authority

MPH .....Miles per Hour

NB.....Northbound

NEPA .....National Environmental Policy Act

NRHP.....National Register of Historical Places

PMT.....Program Management Team

RCP .....Reinforced concrete pipe

ROW.....Right-of-Way

SB .....Southbound

SCG .....Southern California Gas Company

SCRRA .....Southern California Regional Rail Authority (Metrolink)

SR .....State Route

SWG .....Stakeholder Working Group

TM.....Technical Memorandum

TOD.....Transit-Oriented Development

USGS .....United States Geological Survey

UPRR .....Union Pacific Railroad

VCP .....Vitrified Clay Pipe

1.0 SUPPLEMENTAL ALTERNATIVES ANALYSIS REPORT

This April 2012 Palmdale to Los Angeles Supplemental Alternatives Analysis (AA) Report updates the Palmdale to Los Angeles high-speed train (HST) section Preliminary AA Report issued by the California High-Speed Rail Authority (Authority) in July 2010, and the Palmdale to Los Angeles HST section Supplemental AA Report issued by the Authority in March 2011. The March 2011 Supplemental AA Report evaluated the subsections from Los Angeles Union Station (LAUS) to Sylmar, and there have been no further changes to these subsections. This Supplemental AA focuses solely on the Sylmar to Palmdale subsection.

This Supplemental AA documents additional evaluation, development and refinement of design options recommended for further study through the environmental process between Sylmar and Palmdale. Alternatives have been evaluated that refine the SR 14 East and SR 14 West alignments to address concerns and reduce potential impacts in the Acton/Agua Dulce and Sand Canyon areas identified by public input, and preliminary engineering and environmental review, following the preliminary alternatives analysis process.

1.1 Alternatives Development Process

Multiple design options and alignments were considered in this Supplemental AA. The alternatives development process includes 1) refinements of alternatives studied in the Preliminary AA, 2) alternatives suggested by the stakeholders during the public outreach process, and 3) alternatives that meet the purpose and need while avoiding or reducing environmental impacts. The evaluation process considers the physical feasibility of options, environmental impacts, and how the options meet the project's purpose and need.

Both CEQA and NEPA provide guidance on the alternatives analysis process. Under CEQA, an Environmental Impact Report (EIR) shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. An EIR is not required to consider alternatives that are infeasible (CEQA Guidelines Section 15126.6).

The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) potential infeasibility, or (iii) inability to avoid at least some significant environmental impacts (CEQA Guidelines Section 15126.6(a)). Under CEQA, " 'feasible' means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." (CEQA Guidelines Section 15364). It includes many potential items, including but not limited to the ability to obtain, as necessary, environmental permits from resource agencies such as the USFWS, USACE and SWRCB.

For an Environmental Impact Statement (EIS), NEPA requires a rigorous exploration and objective evaluation of all reasonable alternatives that meet the purpose and need (40 C.F.R. 1502.14). Reasonable alternatives are those that are practical or feasible from the technical and economic standpoint; these are identified through the alternatives analysis process. Those reasonable alternatives are then carried forward for further analysis in the Draft EIR/EIS.

1.2 Meeting Project Purpose and Need

This Supplemental AA compares the design and alignment options to the Authority's adopted HST system project purpose and need in support of the project goals as described below:

The purpose of the statewide HST system is to provide a reliable high-speed electric-powered train system that links the major metropolitan areas of the state, and that delivers predictable and consistent travel times. A further objective is to provide an interface with commercial airports, mass transit, and the highway network, and to relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources (Authority and FRA 2005).

The Authority has adopted the following objectives and policies for the proposed HST system:

- Provide intercity travel capacity to supplement critically overused interstate highways and commercial airports.
- Meet future intercity travel demand that will be unmet by present transportation systems and increase capacity for intercity mobility.
- Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways.
- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel.
- Provide a sustainable reduction in travel time between major urban centers.
- Increase the efficiency of the intercity transportation system.
- Maximize the use of existing transportation corridors and rights-of-way, to the extent feasible.
- Develop a practical and economically viable transportation system that can be implemented in phases and generate revenues in excess of operations and maintenance costs.
- Provide intercity travel in a manner sensitive to and protective of the region's natural resources and reduced emissions and vehicle miles traveled for intercity trips.

While this Supplemental AA process considers alignment and design options within a very small section of the entire HST network, these alternatives and design options are evaluated in the context of the HST system as a whole in order to meet the HST project goals. Design options in individual subsections that may have some lesser environmental impacts, but decrease operating speeds, disproportionately increase implementation cost, and/or require operational exceptions as compared to other options, could cumulatively influence how the HST system can meet its project goals. The purpose of this Supplemental AA is to describe the range of design options and alignment alternatives considered for the Sylmar to Palmdale subsection, and report how they either meet and support the HST project goals and are recommended for additional analysis in the EIR/EIS, or how they do not meet the objectives and policies of the HST system and are eliminated from further evaluation.

1.3 Community Outreach

In March 2011, the Authority Board approved recommendations for supplemental alignment alternatives and station options for the Sylmar to Los Angeles subsection. The Palmdale to Sylmar alignment alternative and station option recommendations were delayed until further discussions with stakeholders were held to identify alignment adjustments being proposed. During the past several months, the Palmdale to Los Angeles team has met with stakeholders from Palmdale to Sylmar to hear their concerns and identify potential modifications. These stakeholder meetings are listed in Appendix B.

Concerns raised at these meetings include connectivity, noise/vibration, eminent domain, grade crossings, future development plans, visual impacts and wildlife, each of which will be considered in greater detail during the environmental review and/or design refinement processes.

City of Santa Clarita

The Santa Clarita City Council has not taken an official position on the Project. The team continues to work with Santa Clarita city staff to discuss alignment alternatives and station options. City staff is concerned about impacts to the Santa Clarita Valley community associated with the high-speed train without commensurate benefits. City staff is interested in station connectivity and in identifying how residents will access a HST system via current Metrolink stations. City staff is also concerned about potential substantial impacts to the proposed Vista Canyon development, which the Preliminary AA alignment crosses.

Towns of Acton and Agua Dulce

Members of the Acton and Agua Dulce Town Councils participate in a Stakeholder Working Group that includes stakeholders through the Antelope Valley including elected official staff, the Acton/Agua Dulce School District Superintendent and Board members, and the business community. The group's concerns include potential noise and visual impacts, impacts to schools, and quality of life changes. They question the decision eliminating the Soledad Canyon alignment in the Preliminary AA. The project team developed engineering designs for several adjusted alignments suggested by members of the Acton and Agua Dulce Town Councils; however they remain concerned about any above-ground alignment in the area.

City of Palmdale

The City of Palmdale council and staff support an alignment via the Antelope Valley that includes a station in Palmdale. The city prefers the SR 14 East alignment because it has the station at the existing Palmdale Transportation Center.

Los Angeles County Supervisor Michael D. Antonovich

The Supervisor favors an Antelope Valley alignment with a station in Palmdale and is eager to see early investments (e.g. grade separations) in the San Fernando Valley move forward.

1.4 Previously Identified Alternative Alignments – Background

The Palmdale to Los Angeles HST Section was divided into five subsections to facilitate analysis of potential alignment alternatives, station locations, and design options. The approximate geographic limits for each subsection are points where the HST alignment alternatives converge, such that alignment alternatives for each subsection could be "mixed and matched" with those from adjacent subsections. The subsections are listed below, south to north, and are shown in Figure 1.4-1:

- Los Angeles Union Station (LAUS) – addressed in the July 2010 Los Angeles to Anaheim Supplemental Alternative Analysis Report.
- LAUS to Metrolink Central Maintenance Facility (CMF)
- Metrolink CMF to SR 2
- SR 2 to Sylmar
- Sylmar to Palmdale

The alternatives previously identified in the March 2011 Supplemental AA to be carried forward for analysis in further AA reports and/or the EIR/EIS process were:

- LAUS to Metrolink Central Maintenance Facility (CMF): LAPT1, LAPT3, and LAP1C

- Metrolink CMF to SR 2: HST following Metrolink alignment at-grade, and HST in tunnel
- SR 2 to Sylmar alignment: Profiles A, B1, B2, and C, all with HST east of Metrolink
- SR 2 to Sylmar stations: Buena Vista, Branford, and San Fernando
- Sylmar to Palmdale alignment: SR 14 East, and SR 14 West
- Palmdale stations: Palmdale Transportation Center, and Palmdale West

These are shown in Figure 1.4-2.

Figure 1.4-1 Los Angeles to Palmdale Subsections

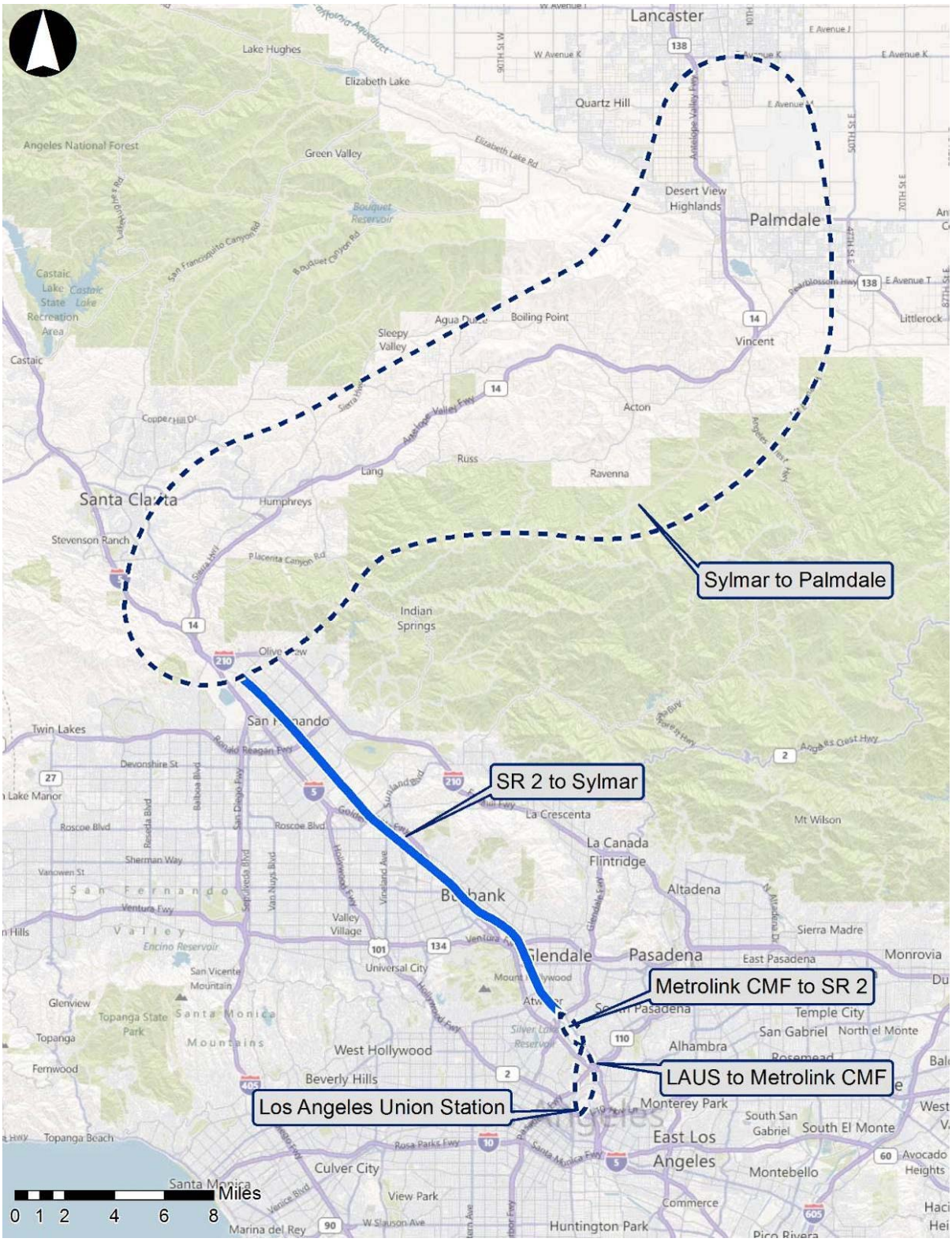
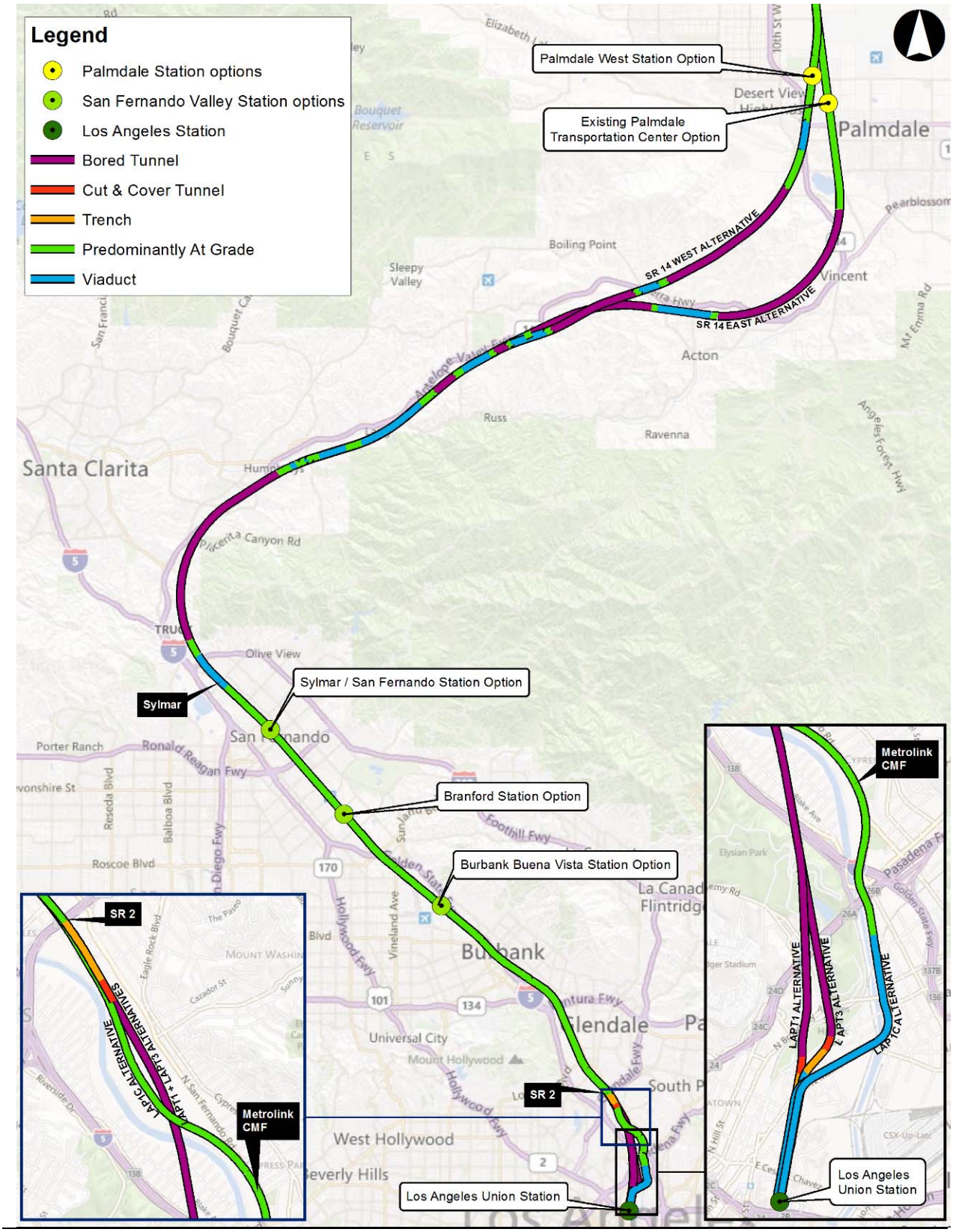
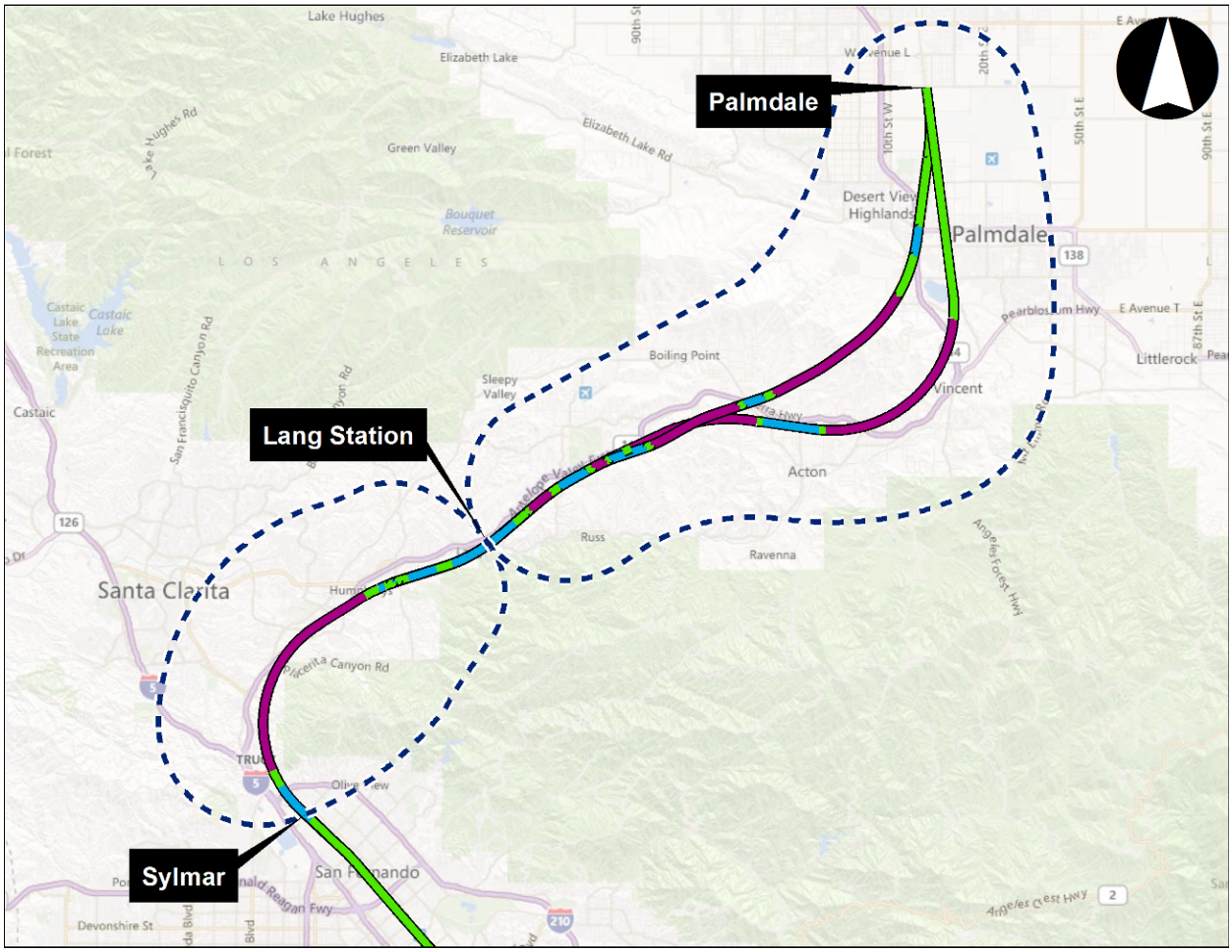


Figure 1.4-2 Previously Identified Alignments and Stations



Because the two sets of options within the Sylmar to Palmdale subsection discussed in this Supplemental AA can be considered independently, Sylmar to Palmdale has been further split into a Santa Clarita subsection (covering Sand Canyon) that runs from Sylmar to Lang and a Palmdale subsection (covering Acton/Agua Dulce) that runs from Lang to Palmdale. These subsections are shown on Figure 1.4-3. No changes have been made to the other subsections from LAUS to Sylmar since the adoption of the March 2011 Supplemental Palmdale to Los Angeles Alternative Analysis Report.

Figure 1.4-3 New Sylmar to Palmdale Subsections



1.5 Santa Clarita Subsection

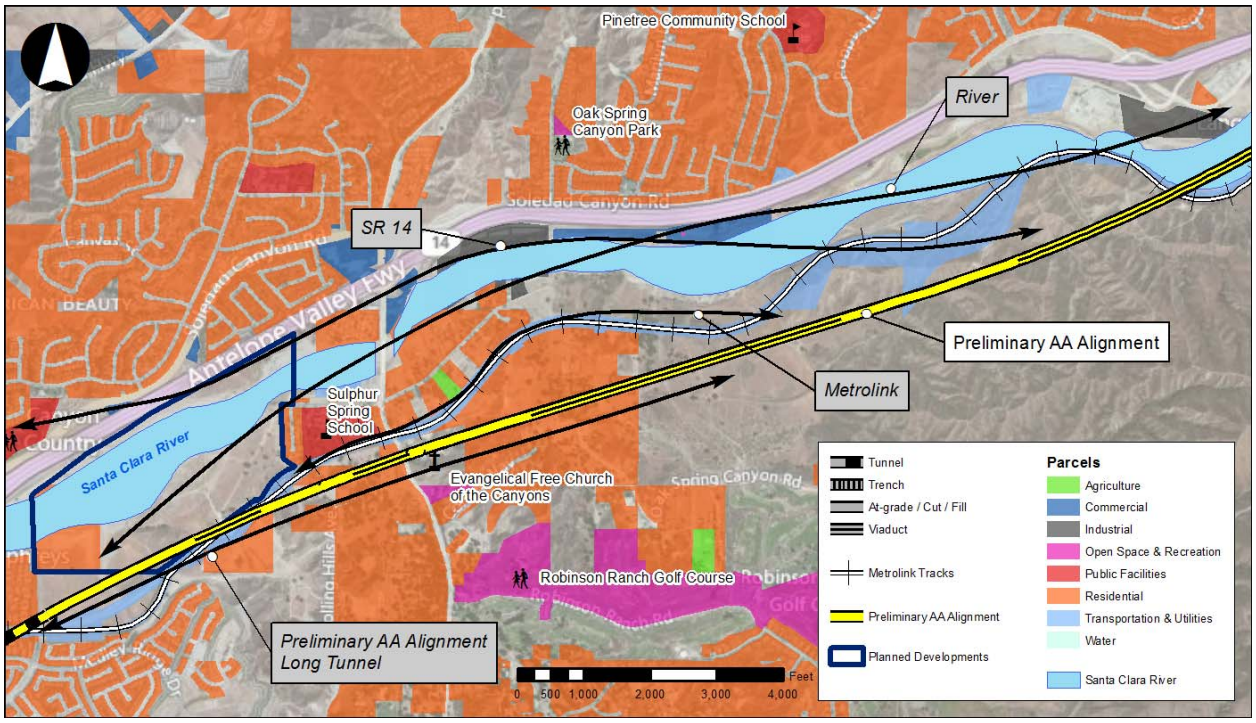
In response to resident concerns in the Sand Canyon area, several options were investigated that refine the Preliminary AA alignments and incorporate suggestions made during the public input process. The suggestions are illustrated on Figure 1.5-1. Some of these suggestions, as described in section 1.5.1, did not offer the chance of developing reasonable alternatives as defined by CEQA/NEPA and so were not evaluated further.

Section 1.5.2 describes the options evaluated and Section 1.5.3 provides a summary of the evaluation of the options.

1.5.1 Options Considered but Screened Out

- An alignment that closely followed SR 14 through the Sand Canyon area was suggested by stakeholders. To do this would either require train speeds below 100mph, not meeting the project purpose and need of providing high-speed rail service, or displace many more residences than the other options.
- An alignment that closely followed Metrolink all the way through the Sand Canyon area was suggested by stakeholders. To do this would require train speeds below 100mph, not meeting the project purpose and need of providing high-speed rail service.
- Extending the tunnel by two miles through Sand Canyon was suggested by stakeholders. Because of operational, maintenance and safety issues and high capital and operational costs associated with tunnels, tunneling is only considered when the topography of the ground makes it necessary or there is a major significant impact which cannot be mitigated in any other way. The impacts from an at-grade/aerial option through Sand Canyon that cannot be mitigated by developing alternative above ground options are not sufficiently severe to make this a reasonable option to consider.

Figure 1.5-1 Sand Canyon Options Considered



1.5.2 Description of Options Evaluated

Sand Canyon Preliminary AA Alignment

The alignment through the Sand Canyon area included in the Preliminary AA Report is a single alignment. It would emerge from a tunnel into cut, crossing the southern edge of the proposed Vista Canyon development. It would then pass through residential areas near Sand Canyon Road at-grade. It would

cross Sand Canyon Road on viaduct and displace the Evangelical Free Church of the Canyons and more residential parcels east of the road.

Sand Canyon River Option

An alignment that passes north of Sulphur Springs School and runs along the Santa Clara River to minimize residential impacts was investigated. The alignment is constrained by the need to avoid emerging into a trench in the bed of the Santa Clara River. Viaduct column foundations in the river bed would be needed.

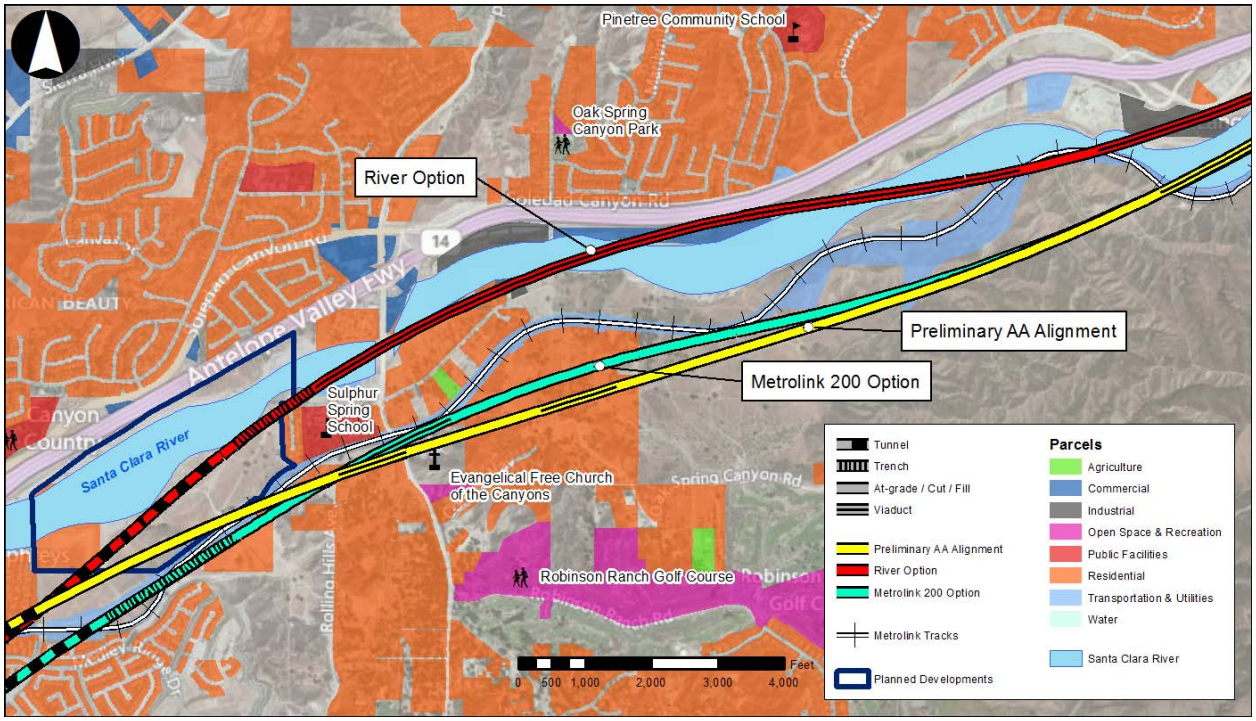
Sand Canyon Metrolink 200 Option

An option with the design speed reduced to 200mph in order to follow Metrolink more closely west of Sand Canyon Road was investigated. This emerges from tunnel south of the Metrolink right-of-way, follows that right-of-way over Sand Canyon Road then passes north of the Evangelical Free Church of the Canyons.

1.5.3 Evaluation of Options

The options described in Section 1.5.2 were assessed based on the project objectives, ability to reduce impacts and evaluation measures described in the Preliminary AA Report, which are consistent with evaluation criteria adopted by the Authority. The options evaluated are presented on Figure 1.5-2. Table A-1 in Appendix A presents the detailed evaluation of the options. The relevant data presented in this table are summarized in the discussion for each alternative below.

Figure 1.5-2 Sand Canyon Options Evaluated



Sand Canyon Preliminary AA Option

The Preliminary AA Option has a design speed of 220mph. It directly impacts approximately 23 residential parcels, passes within 400 feet of Sulphur Springs School and Pine Crest School property lines, and displaces the Evangelical Free Church of the Canyons beside Sand Canyon Road. It also crosses the southern edge of the proposed Vista Canyon development. It has no impact on the Santa Clara River in this area, and fewest impacts to aquatic resources consisting of 2,200 linear feet of streams/creeks within 100 feet and 5 hydrologic feature crossings. Other impacts are similar to other options. **This option is carried forward for further consideration.**

Sand Canyon River Option

An alignment emerging from tunnel into a trench in the Santa Clara River bed would constrict the flow of the river and impact a large acreage of river habitat. Accordingly, the alignment had to be designed with the trench emerging south of the river, in the proposed Vista Canyon development. As a result, the trench would impact the corner of the Sulphur Springs School site and would block access to residential parcels on La Vada Avenue. This means it would directly impact approximately 25 residential parcels, more than the Preliminary AA Option. This option directly impacts approximately 5500 linear feet of the Santa Clara riverbed. This option also contains approximately 26 acres of lakes/ponds/swamps/reservoirs within 100 feet of the alignment, therefore having most impacts to aquatic resources. Viaduct column foundations in the river bed would be required, disrupting natural habitat and creating a new obstruction to river flow with the potential to cause upstream flooding. This option is farthest from the church. The long viaduct in the river means that this option has a higher visual impact than the other options. Because of greater potential for significant environmental impacts in many resource areas, particularly the residential and water resource impacts, and no substantial reduction of other environmental impacts as compared to the other options, **this option is withdrawn from further consideration.**

Sand Canyon Metrolink 200 Option

This option avoids displacing the church but passes within 200 feet of the church building, within 400 feet of Sulphur Springs School property line, and within 300 feet of the Pine Crest School site. It avoids direct impacts on the proposed Vista Canyon development. This option directly impacts approximately 10 residential parcels, less than the Preliminary AA Option, but imposes a 200 mph speed limitation giving a 15-second journey time penalty compared with the Preliminary AA Option. Other impacts are similar to other options. **This option is carried forward for further consideration.**

1.6 Palmdale subsection

Due to resident concerns in the Acton/Agua Dulce area, several options were investigated that refine the SR 14 East and SR 14 West alignments and respond to suggestions made during the public input process. The suggestions are illustrated on Figure 1.6-1. Some of these suggestions, as described in section 1.6.1, did not offer the chance of developing reasonable alternatives as defined by CEQA/NEPA and so were not evaluated further.

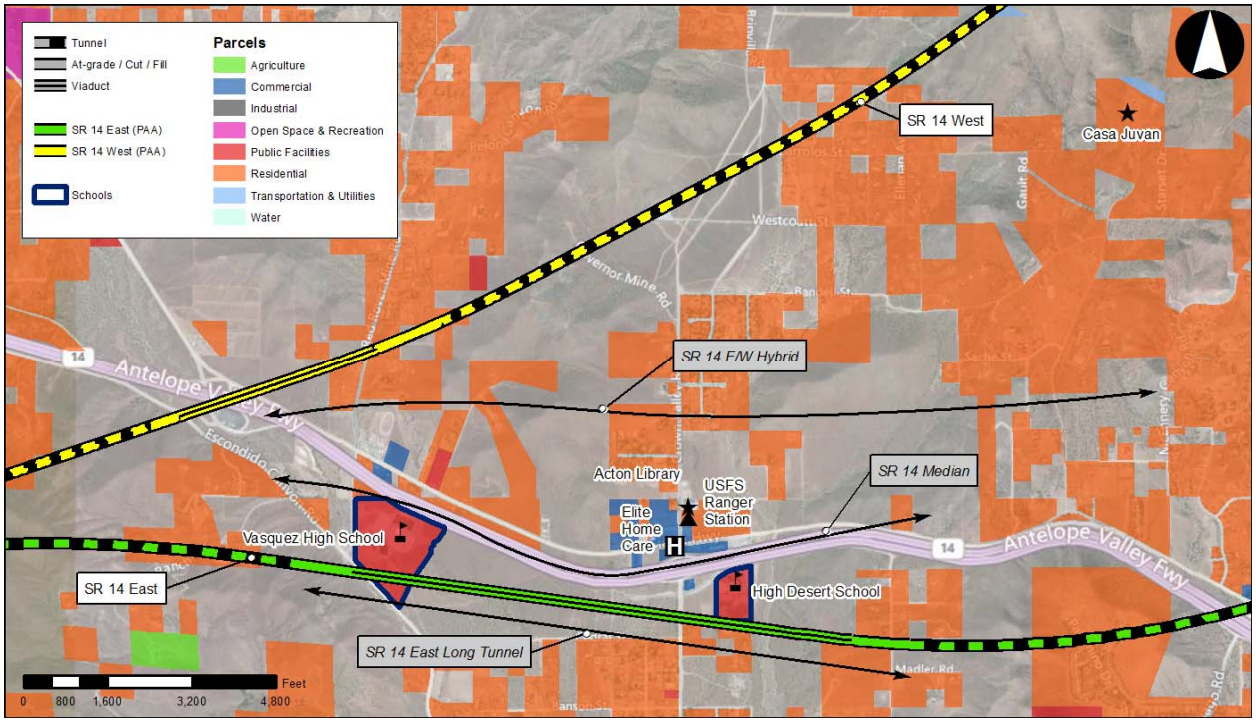
Section 1.6.2 describes the options evaluated and Section 1.6.3 provides a summary of the evaluation of the options.

1.6.1 Options Considered but Screened Out

- An alignment following the SR 14 median was suggested by stakeholders. To do this would require train speeds below 100mph, not meeting the project purpose and need of providing high-speed rail service.
- Joining the tunnels together to create an approximately 12-mile tunnel all the way through Acton was suggested by stakeholders. Because of operational, maintenance and safety issues and high capital and operational costs associated with tunnels, tunneling is only considered when the

topography of the ground makes it necessary or there is a major significant impact which cannot be mitigated in any other way. The impacts from an at-grade/aerial option through Acton that cannot be mitigated by developing alternative above ground options are not sufficiently severe to make this a reasonable option to consider.

Figure 1.6-1 Acton Options Considered



1.6.2 Description of Options Evaluated

Acton SR 14 East Option

The Preliminary AA SR 14 East alignment crossed the southern edge of the the proposed Vasquez High School development about 75 feet from the nearest proposed school facilities, and was 600 feet from the High Desert school property in Acton. This alignment has been refined to avoid directly impacting the Vasquez High School property, lower it by 20 ft, and move it 600 ft from the proposed school facilities. In Palmdale this option follows the Metro/UPRR right-of-way with a station at the Palmdale Transportation Center.

Acton SR 14 West Option

The Preliminary AA SR 14 West alignment in Acton is about 2850 ft from Vasquez High School, and was refined to avoid the Ward Road interchange bridge, without additional direct residential impacts. In Palmdale this option is close to SR 14 and crosses mostly vacant land before joining the Metro/UPRR right-of-way near Avenue M. It has a station west of the existing Palmdale Transportation Center near Avenue P.

Acton SR 14 E/W Hybrid Option

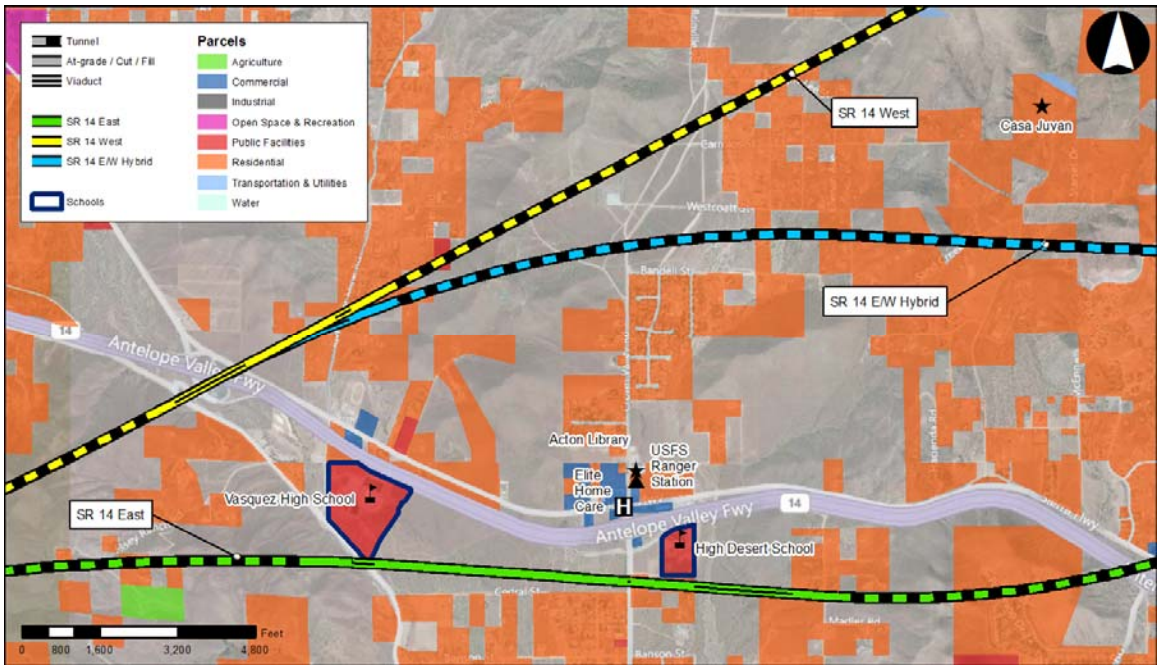
An option that followed the SR 14 West alignment up to the tunnel portal in Acton and entered Palmdale east of Palmdale Lake (similar to SR 14 East) was investigated. This option would have similar residential impacts in Acton to SR 14 West, avoiding impacts to Vasquez and High Desert Schools, and an

approximately 7 mile long tunnel with a 175 mph design speed, resulting in a 20 second (less than 5%) journey time penalty. In Palmdale this option follows the Metro/UPRR right-of-way with a station at the Palmdale Transportation Center.

1.6.3 Evaluation of Options

The options described in Section 1.6.2 were assessed based on the project objectives, ability to reduce impacts and evaluation measures described in the Preliminary AA Report, which are consistent with evaluation criteria adopted by the Authority. The options evaluated are presented on Figure 1.6-2. Table A-2 in Appendix A presents the detailed evaluation of the options. The relevant data presented in this table are summarized in the discussion for each alternative below.

Figure 1.6-2 Acton Options Evaluated



Acton SR 14 East Option

The SR 14 East Option avoids direct impact on both school sites although it passes within 600 feet of the proposed Vasquez High School buildings and within 750 feet of the High Desert School in Acton. Acton residents remain concerned about the noise and visual impacts from this option. It directly impacts about 6,800 linear feet of streams and creeks, and the corners of Palmdale Lake and Lake Una. The longer route length means journey time would be greater for SR 14 East than for SR 14 West and construction would be more expensive because of increased route length and tunnel length, but SR 14 East allows the HST to follow the Metro/UPRR right-of-way to the existing Palmdale Transportation Center. It also provides an option in the Acton area, should further analysis of SR 14 West reveal some unforeseen major flaw. **This option is carried forward for further consideration.**

Acton SR 14 West Option

The SR 14 West alignment is the fastest and least expensive option compared to the other options considered and has the least impact to the Acton community. It is more than half a mile from the schools in Acton. It directly impacts about 2,800 linear feet of streams and creeks, and does not impact

Palmdale Lake or Lake Una. The SR 14 West Option is closer to SR 14 but would have a greater impact on future development in Palmdale than the other two options because it would not follow the Metro/UPRR right-of-way and would not put the HST station at the existing Palmdale Transportation Center. **This option is carried forward for further consideration.**

Acton SR 14 E/W Hybrid Option

This option combines the reduced impact on Acton from SR 14 West with following the Metro/UPRR right-of-way to the existing Palmdale Transportation Center. It directly impacts about 5,400 linear feet of streams and creeks, and the corners of Palmdale Lake and Lake Una. This option has a somewhat reduced design speed through the tunnel, giving a further 20 second journey time penalty compared to SR 14 East. **This option is carried forward for further consideration.**

2.0 RECOMMENDATION

The alternatives evaluated in this Supplemental AA are summarized in Table 2.0-1, and alternatives recommended for further investigation are listed below:

Santa Clarita Subsection

- Preliminary AA option (renamed Santa Clarita North)
- Metrolink 200 option (renamed Santa Clarita South).

Palmdale Subsection

- SR 14 East option
- SR 14 West option
- SR 14 E/W Hybrid option.

Therefore, based on the Preliminary AA (July 2010), the first Supplemental AA (March 2011) and this second Supplemental AA (April 2012), the alternatives identified for further investigation in the EIR/EIS development process and illustrated on Figure 2.0-1, are:

- LAUS to Metrolink Central Maintenance Facility (CMF) subsection: LAPT1, LAPT3, and LAP1C
- Metrolink CMF to SR 2 subsection: HST following Metrolink alignment at-grade, and HST in tunnel
- SR 2 to Sylmar subsection alignment: Profiles A, B1, B2, and C, all with HST east of Metrolink
- SR 2 to Sylmar subsection stations: Buena Vista, Branford, and San Fernando
- Santa Clarita subsection: Santa Clarita North and Santa Clarita South.
- Palmdale subsection alignment: SR 14 East, SR 14 West, and SR 14 E/W Hybrid
- Palmdale subsection stations: Palmdale Transportation Center, and Palmdale West

Figure 2.0-1 Alignment Alternatives and Station Options

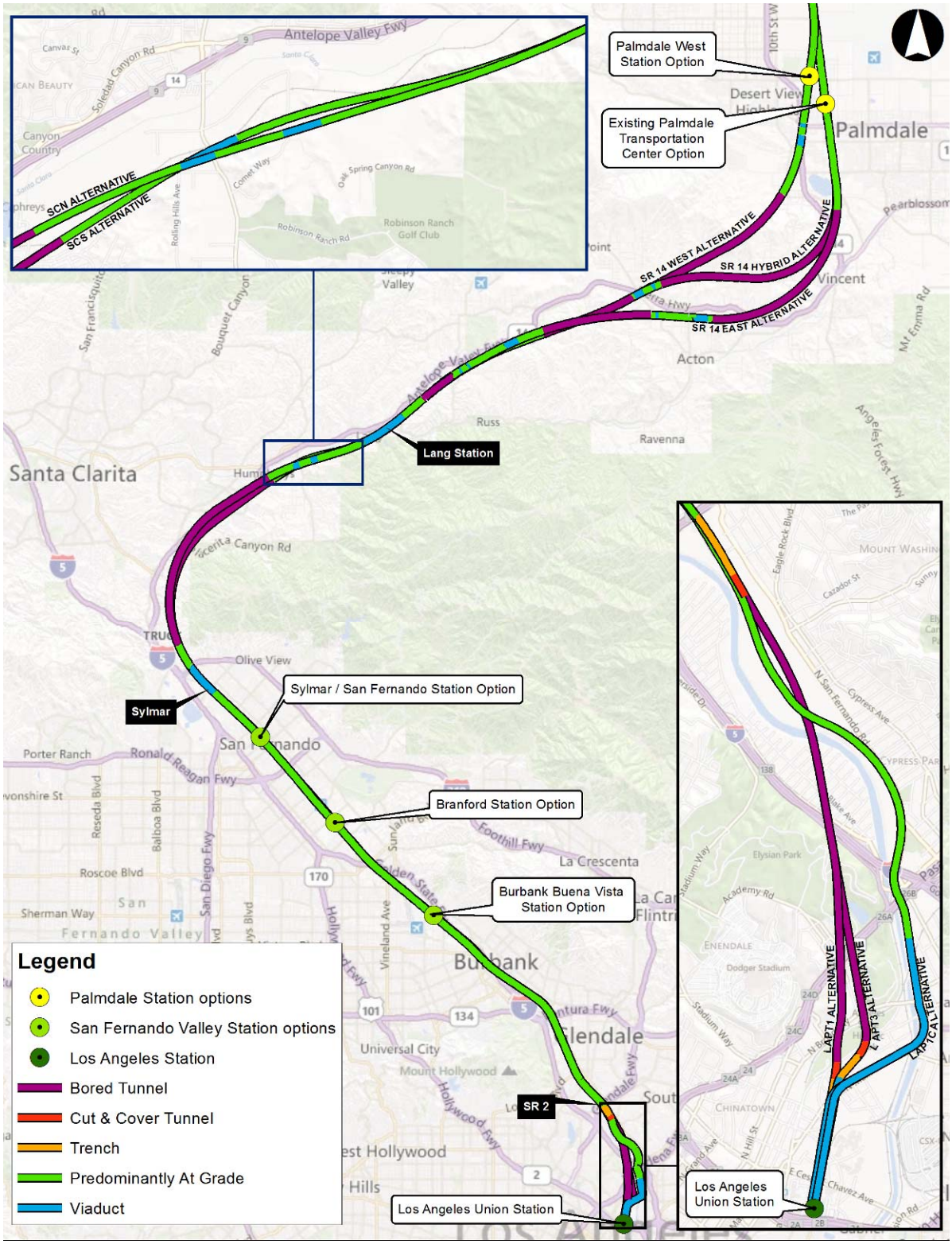


Table 2.0-1 Alternatives Evaluation Summary

ALIGNMENT ALTERNATIVES	AA DECISION		REASONS FOR ELIMINATION (P–Primary S–Secondary)							ENVIRONMENTAL/OTHER CONCERNS
	Carried Forward	Not Carried Forward	Construction	Incompatibility	Right-of-Way	Connectivity/ Accessibility	Revenue/ Ridership	Community Impact	Environment	
Santa Clarita Subsection - Sand Canyon Options										
Preliminary AA Option	X									Residential impacts; church displaced; no impact on the Santa Clara River.
River Option		X	S					S	P	Greater impact to Santa Clara River disturbing sensitive habitat and potentially increasing flooding risk; slightly more residential impacts and greater visual impacts.
Metrolink 200 Option	X									Residential impacts; close to school and church;
Palmdale Subsection - Acton Options										
SR 14 East	X									Close to schools in Acton; longer and more expensive route; station at the Palmdale Transportation Center
SR 14 West	X									Reduced impacts in Acton; lowest cost and fastest option; station is not at the Palmdale Transportation Center.
SR 14 E/W Hybrid	X									Combines reduced impacts in Acton with station at the Palmdale Transportation Center; somewhat longer tunnel; 20 second journey time penalty from slower speed curves.

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